Game Design

Website (http://www.northeastern.edu/camd/game designing)

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Games are an important part of popular culture that now have grown into the largest segment of the global entertainment industry. No longer constrained to computers and consoles, games have become ubiquitous across every facet of the media landscape. The industry has evolved from being dominated by large commercial studios, to a wider variety of scales and styles of game maker, and has expanded beyond entertainment to all areas of society from fine arts, to education, to government, to health, to science. The growth of digital games has generated renewed interest in physical and board games, as well as hybrid “transmedia” games that integrate a variety of different media platforms. The ability to think literally “outside the box” of conventional game platforms has become essential to surviving in this new games ecosystem. Games at Northeastern, a multidisciplinary program between the College of Arts, Media and Design and the College of Computer and Information Science, is pushing the boundaries of innovation in games through multidisciplinary collaborations bridging design and research engaging a broad array of fields including psychology, computing, anthropology, humanities, social science, engineering, and emerging disciplines such as health informatics, network science, and digital humanities.

The multidisciplinary nature of games both attracts and produces students with varied interests in arts, expression, and the science of games to collaboratively explore the potential of games across media through critical making and research. Through shared and discipline-specific courses, undergraduates enroll in the BFA—which emphasizes creativity, design, and expression in games, or the BS—which focuses on realizing vision and innovation through technical implementation. The program also introduces students to the wide array of game genres and applications, from independent and art games, to serious documentary and activist games, to games for health, as well as research disciplines such as analytics and ethnography, human-computer interaction, and user testing. Students will push the boundaries of games, creating alternative gameplay, exploring new experiential and visual aesthetics, examining how people play and interact with games, or building the technological underpinnings to make it all work.

Each of the game degrees foster experiential learning opportunities utilizing diverse intersections of skills that merge theory and practice, art, and expression blended with technology. Focus is on establishing core skills that engage critical thinking as excellent preparation for professional practice in game creation and research or moving on to advanced study. Students will have an opportunity to develop tools to succeed, eagerness to innovate, and skills to become next-generation entrepreneurs in an ever-changing games landscape. Practical and technical experiential training will be offered via Northeastern's world-renowned co-op program.

Entering the Major or Combined Majors
Students interested in games are encouraged to inquire and apply. Incoming freshmen may select any of our degree offerings directly upon application.

The curriculum shares a set of foundational courses, and each degree also has its own discipline-specific courses targeted to its own set of subdisciplines. Students interested in game design, specifically the creation of game mechanics and gameplay, as well as integration of game elements, would choose the BFA in games; those interested in visual arts as applied to games would take the BFA in digital art and game design; and those interested in computing and game development, implementing games through coding, and building underlying technologies such as game engines, would take the BS in computer science and game development.

The BFA in digital art and game design combined major offers students an opportunity to develop skills in the visual arts within games, while focusing on the depth of knowledge required to be successful in a highly competitive industry. The continuing revolution in digital computing and animation has produced a rapidly evolving field for artists who create aesthetics, characters, and environments for games. The combined majors encourage students to think and work collaboratively in multidisciplinary teams. The collaborative approach helps all team members to understand the context in which their asset contributions are used and to develop visual design skills in the service of larger experiential goals. Students have many opportunities to collaborate with their peers and work with students in all game design combined majors, culminating in a two-semester senior capstone. Students will have a home college in the College of Arts, Media and Design but will have a minimum of four interdisciplinary courses where students interact and work together with students in the BS in computer science degree.

The BFA in games seeks to give students the skills to communicate ideas and emotions through interactive media. The focus of the BFA degree is to explore games as an aesthetic and expressive form through critical analysis and creative, reflective practice. To reflect emerging trends in the video game industry, including broader platforms and audiences and more distribution channels, students will be oriented toward developing games and playable media in an independent creative context, preparing graduates to become leaders within a growing segment of the game industry. Curriculum is geared to cultivating the students’ own unique creative voice through courses that apply theory analysis to game-making practice across a wide range of media. Students are exposed to a wide variety of genres and contexts, as well as different ways of thinking about games content, platforms, and production. Students will have a home college in the College of Arts, Media and Design but will have a minimum of four interdisciplinary courses where students interact and work together with students in the BS in computer science degree.

The BS in computer science and game development is inherently interdisciplinary and exposes students to both faculty and students from both the College of Computer and Information Science and the College of Arts, Media and Design. The focus of the BS degree is to learn the software development side of game implementation. Students have an opportunity to learn how to build high-quality software and games. Students interact and collaborate with students in other game degrees.
through project-oriented courses that are geared toward developing games for students’ portfolios and resumes. Students will have a home college in the College of Computer and Information Science but will have a minimum of four interdisciplinary courses where students interact and work together with BFA students in the College of Arts, Media and Design.

All degree offerings come together in several courses, including the following:

- **GAME 1110** Games and Society 4
- **GAME 3700** Rapid Idea Prototyping for Games 4
- **GAME 3800** Game Concept Development and Production 4
- **GAME 4700** Game Design Capstone 1 4
- **GAME 4701** Game Design Capstone 2 4

The student’s senior year in the program is devoted to integrating these components in a capstone project. Students work as interdisciplinary teams, drawing on their accumulated knowledge to develop and deliver a single original project.

**Academic Progression Standards**
Same as college standards.

**Programs**

**Bachelor of Fine Arts (BFA)**
- Games ([http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/games-bfa](http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/games-bfa))
- Digital Art and Game Design ([http://catalog.northeastern.edu/undergraduate/arts-media-design/art-design/game-art-animation-bfa](http://catalog.northeastern.edu/undergraduate/arts-media-design/art-design/game-art-animation-bfa))

**Bachelor of Science (BS)**
- Computer Science and Game Development ([http://catalog.northeastern.edu/undergraduate/computer-information-science-combined-majors/computer-science-game-development-bs](http://catalog.northeastern.edu/undergraduate/computer-information-science-combined-majors/computer-science-game-development-bs))

**Minors**
- Game Design ([http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/game-design-minor](http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/game-design-minor))
- Game Art ([http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/game-art-minor](http://catalog.northeastern.edu/undergraduate/arts-media-design/game-design/game-art-minor))

**Courses**

**Game Design Courses**

**GAME 1110. Games and Society. 4 Hours.**
Provides an historical and cultural perspective on games and other forms of interactive entertainment. Examines the present state and future directions of paper, card, and board games; physical games and sports; and video games. Introduces students to current issues, experiments, and directions in the field of game design. Through weekly lectures and small-group labs, students have an opportunity to develop a critical basis for analyzing game play.

**GAME 1850. Experimental Game Design. 4 Hours.**
Explores traditions of games, play, participation, and procedurality in twentieth-century art movements, including Dada, Surrealism, Fluxus, conceptual art, the Situationists, Happenings, participatory performance and Tactical Media, avant-garde music, and contemporary art games. Through readings, lectures, and studio assignments, offers students an opportunity to understand and apply key principles by creating a series of artworks using various strategies drawn from these traditions, including appropriation, scores, intervention, and expression.

**GAME 1990. Elective. 1-4 Hours.**
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

**GAME 2010. The Business of Games. 4 Hours.**
Surveys a wide array of game-specific industry topics, including pitching and development of talking points, business models and revenue structures, studio organization and style, intellectual property, contracts, project management expectations, project green-lighting, production pipelines, return on investment, outsourcing, and marketing. Exploring historical shifts and evolution of the video game market offers students an opportunity to obtain perspective on the status of the industry and potential growth in the economy.

**GAME 2150. Programming for Games. 4 Hours.**
Offers students an opportunity to build computer game components and small complete games that explore physical principles in games, artificial intelligence, collision detection, and particle systems while gaining familiarity with common game engine libraries.

**GAME 2200. Games and Learning. 4 Hours.**
Describes the classical work on the relationship of play to learning and real life. Focuses on how players learn in and from games. Discusses how learning theories and principles relate to the design of entertainment games and games for impact. Also explores how game mechanisms can be applied beyond games such as in websites and education. Offers students, both in individual and group assignments, an opportunity to analyze and design game mechanisms to support learning, including writing game reviews and developing game concepts. Culminates in a final project in which students need to develop an analog or digital prototype.

**GAME 2355. Narrative for Games. 4 Hours.**
Examines and explores the structure and aesthetics of narrative, specifically in games. Begins by breaking down narrative into its various component parts that include, but are not restricted to, linear/branching narrative, emergent/inherent narrative, narrative obstacles, game pacing and narrative clock, character objectives, protagonist/antagonist, player/character, momentum and emotional journey, and tragic/comic elements. Offers students an opportunity to understand each narrative component through detailed case studies and the creation of narrative artifacts.

**GAME 2500. Foundations of Game Design. 4 Hours.**
Seeks to define the practice of game design within the larger context of playful interaction design, while constantly maintaining a player-centric approach. Unfolds the process of designing games between phases of analysis, synthesis, and evaluation. Establishes the role of game designer as an expert with a vision for determined player experiences and a vocal advocate for players. Seeks to offer students a broad methodology consisting of brainstorming methods, prototyping techniques, process management practices, and evaluation procedures to solve a wide array of design problems in an iterative manner.

**GAME 2555. Games for Change. 4 Hours.**
Offers students sound introduction to the psychological and behavioral theories of entertainment media with the goal of implementing these theories to the future design and evaluation of games for change. Focuses more on the psychological, behavioral, and social aspects of video games than on pure technical aspects. Organized around a collection of selected readings and real-world games and discussions. The final project is based on reflective thinking, critical evaluation, and creative application. COMM 2555 and GAME 2555 are cross-listed.
GAME 2650. Introduction to Game Research Methods. 4 Hours.
Surveys research methods and epistemologies relevant to game researchers, designers, and artists, including experimental studies; analytics, formal and historical analysis; ethnography; qualitative social research; and design research. Engages students in lectures, readings, and game faculty guest lectures presenting practical examples of methods discussed in the class. Seeks to familiarize students with core literatures on games, library research, and research design through a series of hypothetical research project drafts and the completion of a research project using a specific method covered in the class.

GAME 2750. Games Criticism and Theory. 4 Hours.
Covers fundamental theories of art, meaning-making, expression, cultural reflection, and criticism concerning media, games, and playful artifacts. Assigns several papers that offer students an opportunity to choose and apply different critical lenses to games, game criticism, and their own gameplay experience. A long-form paper allows students to train writing theoretically informed and argumentatively cogent critical presentations of games and gameplay experience.

GAME 2755. Games and Social Justice. 4 Hours.
Analyzes games from a social justice perspective, encouraging students to consider issues of social stereotyping, normalization, exclusion, and inequity as they apply to games from all sectors of the industry. Discusses and analyzes games using a variety of social theories from a diverse set of fields, including gender studies, critical race theory, and LGBTQ studies. Provides a studio setting in which students have an opportunity to engage in critical making of playable experiences that are based upon and deeply integrate social justice theories in their design.

GAME 2950. Game Studio. 4 Hours.
Offers an experiential learning course in which students collaborate with faculty on a project for credit, which may include research, game creation, or a combination of the two. Offers students an opportunity to co-produce a publishable, distributable, or exhibitable game and/or research paper, which can become part of the student’s portfolio. Course may be taught by an individual faculty member or team-taught to explore a specific topic, such as documentary games, art games, physical interfaces, installations, historical games, live-action role-playing, etc. Offers students an opportunity to gain experience working on a real-world project, as well as being credited for collaboration with an established practitioner/researcher. May be repeated once.

GAME 2990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

GAME 3055. Playful Design. 4 Hours.
Covers how to design for playful engagement across contexts. Surveys basic theories and findings on play in ethology, evolutionary psychology, developmental psychology, anthropology, sociology, and philosophy through readings and discussion. Through lectures and exercises, familiarizes students with traditional design areas of play (toys, playgrounds, amusement parks) and the history, theory, patterns, and methods of evoking playfulness in contexts beyond games, toys, and playgrounds. Encourages students to apply these insights into portfolio work by creating playable experience prototypes across media.

GAME 3150. Game Design Algorithms. 4 Hours.
Seeks to extend student knowledge of common algorithms used in game design. Explores issues of cross-platform coding, midscale games, networked games, dynamic content systems, and working in a team-based coding environment. Working in small groups, students have an opportunity to develop and optimize a multiplayer game over the course of the semester.

GAME 3250. Artificial Intelligence for Games. 4 Hours.
Seeks to extend student knowledge of artificial intelligence techniques used in game design. Explores finite state machines, goal-driven agent behavior, graphs, in-game scripting, path finding, and fuzzy logic. Offers students an opportunity to work in pairs to develop intelligent agents to navigate a variety of game scenarios. Combines student projects competitively and collaboratively to test the robustness of the artificial intelligence solutions.

GAME 3300. Game Interface Design. 4 Hours.
Analyzes both successful and unsuccessful game interfaces from a historical and cultural perspective. Uses interactive design assignments to offer students an opportunity to develop an understanding of game user interface design standards. Encourages students to develop innovative interface designs that support new game content models.

GAME 3400. Level Design and Game Architecture. 4 Hours.
Analyzes game-level designs in a variety of genres and forms. Building upon basic drawing and design skills, students have an opportunity to develop paper prototypes and simple game “mods” in the context of story and game play. Students use computer-based tools to examine game-level architecture. Encourages students to take this elective in preparation for or in parallel to the Game Projects courses. ARTF 1122 and ARTF 1124 recommended (required for combined majors).

GAME 3700. Rapid Idea Prototyping for Games. 4 Hours.
Studies digital and nondigital prototyping techniques through weekly activities in which students build and critique prototypes around a variety of game design themes. Offers students an opportunity to build a portfolio of small proof-of-concept game prototypes over the course of the semester. Additionally, covers how to iterate on a single prototype through a semester-long project in which students have an opportunity to work individually on a larger game design.

GAME 3800. Game Concept Development and Production. 4 Hours.
Offers student teams an opportunity to conceptualize, design, document, and develop a complete game, including content, level design, user interface, and game mechanics as specified in design documents. Offers a set of brainstorming techniques. Students segment the concepts into individual systems and prototype them in an iterative manner, formally iterating over the whole game to improve the player experience. Requires students to maintain a schedule and project management documents. Results in the presentation of the complete game for critique.

GAME 3899. Topics in Game Design. 4 Hours.
Offers a lecture or studio course in game design on a topic not regularly taught in a formal course. Topics may vary from offering to offering. May be repeated up to three times.

GAME 3990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

GAME 4055. Motivational Game Design. 4 Hours.
Explores what motivations drive human behavior and how design can be used to motivate behavior in games. Offers students an opportunity to learn the main research models and findings about fun, enjoyment, and motivation, as well as to explore how design patterns facilitate these engaging qualities and how to apply this knowledge in practice through readings, lectures, autobiographical research, and the co-creation of a wiki of design lenses.
GAME 4155. Designing Imaginary Worlds. 4 Hours.
Offers students an opportunity to learn to conceive, design, and convey imaginary worlds across a wide range of media. The crafting of fictional worlds has become an important skill in the media landscape, whether for video and tabletop games, comic books, novels, film, or television. Analyzes existing works in diverse genres such as fantasy, science fiction, superhero, and supernatural worlds. Explores, through creative projects, the ways in which the use of different media are suited to portray different aspects of an imaginary world.

GAME 4355. Game Scripting. 4 Hours.
Offers students an opportunity to understand the basic principles of game engines and how to control games and game engines through relatively simple scripting techniques. Examines several different game engines, including those where scripting is visual and those where scripting is textual. Studies critical concepts, including the game loop and triggering/collision events. Offers students an opportunity to propose scripts to add to games and to work in teams to devise these scripts (pair programming) and the associated presentations (proposal and completed work). Students choose game engines and scripts to implement based on critical analysis of existing games and on their own aspirations for being innovative game designers.

GAME 4700. Game Design Capstone 1. 4 Hours.
Offers the first course in a two-semester capstone sequence. Offers students an opportunity to take on individual roles in a large-group project, creating a complete game from preproduction through implementation and testing. Students spend the first half of the first semester developing a proposal and testing ideas through simple prototypes, building on their skills from GAME 3700 and GAME 3800. Students then have an opportunity to spend the second half of the first semester, and all of the second semester, developing, play-testing, and iteratively refining a multi-level game.

GAME 4701. Game Design Capstone 2. 4 Hours.
Continues GAME 4700. Offers students an opportunity to continue developing, play-testing, and iteratively refining the multilevel game begun in GAME 4700.

GAME 4970. Junior/Senior Honors Project 1. 4 Hours.
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project. May be repeated without limit.

GAME 4971. Junior/Senior Honors Project 2. 4 Hours.
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field. May be repeated without limit.

GAME 4990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

GAME 4991. Research. 4 Hours.
Offers an opportunity to conduct research under faculty supervision.

GAME 4992. Directed Study. 1-4 Hours.
Provides study for the student whose unique academic needs or interests cannot adequately be satisfied in any of the scheduled courses of the department. May be repeated up to three times.

GAME 4993. Independent Study. 1-4 Hours.
Offers independent work under the direction of members of the department on a chosen topic. Course content depends on instructor. May be repeated without limit.

GAME 4994. Internship. 4 Hours.
Provides students an opportunity for internship work. May be repeated without limit.

GAME 4996. Experiential Education Directed Study. 4 Hours.
Draws upon the student's approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement. May be repeated without limit.

GSND 5110. Game Design and Analysis. 4 Hours.
Provides theoretical background and foundation for analyzing and designing games. Examines fundamental domains that are necessary to understand what games are and how they affect players, including but not limited to interface design, level design, narrative, learning, and culture. Presents relevant concepts and frameworks from a wide variety of disciplines—psychology, phenomenology, sociology, anthropology, media studies, affect theories, learning theories, and theories of motivation—for each domain. Explains the core elements of game design, introduces students to formal abstract design tools, explores several models of design process and iteration, and offers students an opportunity to practice game design in groups.

GSND 5111. Seminar for GSND 5110. 1 Hour.
Offers students an opportunity to discuss and analyze selected games, applying concepts from GSND 5110. Exposes students to a varied mix of AAA and indie titles and demonstrates how to analyze and appreciate them. Open to seniors; restricted to students in selected colleges.

GSND 5122. Business Models in the Game Industry. 1 Hour.
Examines the underlying business structure of the interactive digital entertainment industry and the characteristics of the various participants, notably developers and publishers. Seeks to deliver insight into key business models within the game industry and how the economic challenges interact. Explores the game business landscape across the industry spectrum, ranging from AAA, mobile, casual to indie development. Examines market strategies currently in practice and how they are linked with game analytics. Topics range from retail vs. online, free-to-play modes vs. pay-to-play, as well as basic monetization and distribution channels. Designed to serve as an overview of the various stakeholders in the industry and how they interact.

GSND 5130. Usability and Empirical User Research. 4 Hours.
Focuses on methods and methodologies from human-computer interaction (HCI) and their use in different applications, including apps, Web applications, games, and virtual worlds. Covers the basics of user-oriented evaluation, associated topics, and usability methods. Introduces the design process, usability heuristics, HCI paradigms, task models, and cognitive models. Examines quantitative and qualitative analysis of data. Offers students an opportunity to delve into experimental design, institutional-review-board approvals, ethics, research subject recruitment, and experiment implementations. Applies concepts through concrete projects, case examples, and exercises. Exppects students to be running assignments continually and trying out different evaluation methods and methodologies.